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Marshall Space Flight Center, Alabama 35812
256–544–0030
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Manager of Public and Employee Communications: June E. Malone
Editor: Jenalane Rowe

Director's Corner

Last week, NASA made history once again. I hope you saw it.

The successful Exploration Flight Test-1 of the Orion spacecraft signaled NASA's readiness to progress with manned spaceflight beyond low Earth orbit and to deep space.

It was a remarkable day. We not only witnessed it, we were part of making it possible. I encourage all of the Marshall team, and everyone in the NASA family, to bask in the

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Patrick Scheuermann (NASA)

NASA's New Orion Spacecraft Completes First Spaceflight Test

NASA news release

NASA marked a major milestone Dec. 5 on its journey to Mars as the Orion spacecraft completed its first voyage to space, traveling farther than any spacecraft designed for astronauts has been in more than 40 years.

"Today's flight test of Orion is a huge step for NASA and a really critical part of our work to pioneer deep space on our journey to Mars,"

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The United Launch Alliance Delta IV Heavy rocket with NASA's Orion spacecraft mounted atop, lifts off Dec. 5 from Cape Canaveral Air Force Station's Space Launch Complex 37. (NASA/ Bill Ingalls)

NASA Opens New Cube Quest Challenge with Largest-Ever Prize of $5M

By Janet Sudnik

Remember when the cellular phone morphed from a brick you had to carry around in a bag (if you even had one) to today's small handheld devices capable of major tasks?

NASA is seeking the same kind of leap in small satellites. The agency has opened registration for the Cube Quest Challenge, a Centennial Challenges Program competition that will not only be the first in-space competition, but also offer the largest-ever prize purse of $5 million.

"Cube Quest is an important competition for the agency as well as the commercial space sector," said Eric Eberly, deputy program manager for Centennial Challenges at NASA's Marshall Space Flight Center. "If we can produce capabilities usually associated with larger spacecraft in the much smaller platform of CubeSats, a dramatic improvement in the affordability of space missions will result, greatly increasing science and research possibilities."

Challenge objectives include designing, building and delivering flight-qualified, small satellites capable of advanced operations near and beyond the moon.

Competitors have a shot at a share of the prize money and an opportunity to participate in space exploration and technology development, to include a chance at flying their very own CubeSat to the moon and beyond as a secondary payload on the first integrated flight of NASA's Orion spacecraft and Space Launch System rocket.

The Cube Quest Challenge seeks to develop and test subsystems necessary to perform deep space exploration using small spacecraft. Advancements in small spacecraft capabilities will provide benefits

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moment.

It was thrilling to be at NASA's Kennedy Space Center for the launch, to hear the rumble, feel the vibrations, and see a new era of spaceflight take off. It has been four decades since we flew and tested a craft designed specifically to take humans far from Earth. This is an achievement not only for NASA employees, but also for America, for school children everywhere, and for adventurers of all nations who thrill at the conquest of space.

This remarkable milestone follows in the tradition of Mercury, Gemini, Apollo and Shuttle, and it returns us to the future. Before you know it, the people of the world will witness the launch of the Space Launch System. Only Marshall and its partners have the expertise to build this, the world's most powerful rocket. Only SLS combines the power and capacity to take human explorers to investigate asteroids, return to the vicinity of the moon, and ultimately to walk on the surface of Mars.

Between now and then we have major milestones to achieve -- many coming up fast. RS-25 engine testing starts in the coming weeks at NASA's Stennis Space Center. Spring 2015 will be busy, as we fire Qualification Motor (QM)-1 and complete the newly extended Pegasus barge that will transport the core stage of SLS from our Michoud Assembly Facility to Kennedy. Then next summer, we convene the all-important Vehicle Critical Design Review.

Milestones mark progress and success, and you are essential to both. Only with your enduring support can we keep heading for the stars.

For all of our proud heritage, NASA remains an agency focused on the future. Let's keep up the momentum making space exploration history as only Marshall can.

Patrick

Orion *Continued from page 1*

said NASA Administrator Charles Bolden. "The teams did a tremendous job putting Orion through its paces in the real environment it will endure as we push the boundary of human exploration in the coming years."

Orion blazed into the morning sky at 6:05 a.m. CST, lifting off from Space Launch Complex 37 at Cape Canaveral Air Force Station on a United Launch Alliance Delta IV Heavy rocket. The Orion crew module splashed down approximately 4.5 hours later in the Pacific Ocean, 600 miles southwest of San Diego.

During the uncrewed test, Orion traveled twice through the Van Allen belt where it experienced high periods of radiation, and reached an altitude of 3,600 miles above Earth. Orion also hit speeds of 20,000 mph and weathered temperatures approaching 4,000 degrees Fahrenheit as it entered Earth's atmosphere.

Orion will open the space between Earth and Mars for exploration by astronauts. This proving ground will be invaluable for testing capabilities future human Mars missions will need. The spacecraft was tested in space to allow engineers to collect critical data to evaluate its performance and improve its design. The flight tested Orion's heat shield, avionics, parachutes, computers and key spacecraft separation events, exercising many of the systems critical to the safety of astronauts who will travel in Orion.

On future missions, Orion will launch on the Space Launch System heavy-lift rocket -- currently being developed at NASA's Marshall Space Flight Center. A 70-metric-ton (77-ton) SLS will send Orion to a distant retrograde orbit around the moon on Exploration Mission-1 in the first test of the fully integrated Orion and SLS system.

"We really pushed Orion as much as we could to give us real data that we can use to improve Orion's design going forward," said Mark Geyer, Orion Program manager. "In the coming weeks and months, we'll be taking a look at that invaluable information and applying lessons learned to the next Orion spacecraft already in production for the first mission atop the Space Launch System rocket."

The U.S. Navy's USS Anchorage moves into place to recover NASA's Orion spacecraft following its splashdown in the Pacific Ocean. (NASA)

A team of NASA, U.S. Navy and Lockheed Martin personnel aboard the USS Anchorage recovered Orion and returned it Dec. 8 to U.S. Naval Base San Diego. Orion will then be delivered to NASA's Kennedy Space Center, where it will be processed. The crew module will be refurbished for use in Ascent Abort-2 in 2018, a test of Orion's launch abort system.

Lockheed Martin, NASA's prime contractor for Orion, began manufacturing the Orion crew module in 2011 and delivered it in July 2012 to the Neil Armstrong Operations & Checkout Facility at Kennedy where final assembly, integration and testing were completed. More than 1,000 companies across the country manufactured or contributed elements to Orion. For more on the Marshall Center and North Alabama's contributions to Orion's first flight test, click here.

Students Simulate Mars Missions at Marshall Center

Community college students from around the country completed the annual National Community College Aerospace Scholars event at NASA's Marshall Space Flight Center from Dec. 3-5. The Mars-themed workshop is designed to encourage students from minority-serving community and junior colleges to pursue careers with NASA. (NASA/MSFC/FredDeaton)

Student teams competed in robotic competitions, designed 3D computer-generated rovers and conducted formal presentations on mock missions to the red planet. During the workshop, Marshall team members volunteered as team mentors, spoke about NASA internships and provided facility tours to showcase the Space Launch System – NASA's newest rocket for deep-space exploration to Mars and beyond. (NASA/MSFC/FredDeaton)

Cube Quest Challenge *Continued from page 2*

to future missions and also may enable entirely new mission scenarios, including future investigations of near-Earth asteroids.

All teams may compete in any one of four ground tournaments. Teams that rate high on mission safety and probability of success will receive incremental awards. The ground tournaments will be held every four to six months and participation is required to earn a secondary payload spot on SLS.

The Lunar Derby focuses primarily on propulsion for small spacecraft and near-Earth communications, while the Deep Space Derby focuses on finding innovative solutions to deep space communications using small spacecraft. Together, these competitions will contribute to opening deep space exploration to non-government spacecraft.

NASA's Centennial Challenges Program is part of the agency's Space Technology Mission Directorate. The challenges drive progress in aerospace technology and help find the most innovative solutions to technical challenges through competition and cooperation. For more information on the Cube Quest Challenge and the program, visit www.nasa.gov/winit.

Sudnik, an ASRC Federal/Analytical Services employee, supports the Office of Strategic Analysis & Communications.

'Tis the Season for the 2014 Marshall Center Holiday Reception

The Marshall Exchange is getting ready to deck the halls for the 2014 Marshall Space Flight Center Holiday Reception. On Dec. 11, all Marshall team members are invited to the Activities Building 4316 from 2:30-5 p.m. to celebrate the holiday season.

Door prizes will be given away and winners must be present to win. Festive food and spirits will be available to guests.

High-Five for Santa!

Kids from the Marshall Child Development Center sang Christmas carols and had very important talks with Santa during the annual Marshall Space Flight Center Tree Lighting Ceremony on Dec. 4. Dozens of Marshall team members and their families enjoyed the hot chocolate, cookies, colorful lights and holiday spirit at the event, sponsored by the Marshall Exchange and held on the front deck of Building 4200. (NASA/MSFC/Fred Deaton)

Orion Launch, First Barrel Weld of Space Launch System Featured on 'This Week @NASA'

The successful test flight of NASA's new Orion spacecraft, and the first barrel weld for the Space Launch System -- NASA's newest, deep-space rocket -- were both featured in the latest edition of "This Week @NASA," a weekly video program broadcast nationwide on NASA-TV and posted online.

On Dec. 5, Orion completed Exploration Flight Test-1 by launching on a Delta IV heavy rocket from Cape Canaveral Air Force Station, before safely landing and being recovered in the Pacific Ocean. The uncrewed capsule carried a payload of 1,200 sensors to test and improve future missions with astronauts. These include radiation tests, which Orion encountered as it passed through Earth's Van Allen belts.

Also featured was the completion of the first barrel weld for the engine section of the Space Launch System. The barrel and a ring will house four RS-25 engines that will power the core stage of the rocket. The barrel is flight hardware to be used on Exploration Mission-1, the first uncrewed test flight of the 70-metric-ton configuration of the Space Launch System.

The welds were taken off the Vertical Weld Center tool -- the world's largest spacecraft welding tool -- at the Michoud Assembly Facility, which is managed by NASA's Marshall Space Flight Center.

This and previous episodes can be viewed at www.youtube.com/user/NASAtelevision.